

bills, which however is usually black-tipped when the bird is very young; and I have one with the train which has a considerable portion of its beak black.

181 *a*. *Ardea lepidula* is now and then shot in this part of Bengal, but I have not yet procured a specimen. Mr. Jerdon has obtained it in Southern India.

188. *Argala capillata* (?). I did not see a single example of this species during the late season for these birds.

201, 202. These I have before expressed my presumptive opinion to be *Charadrius Geoffroyi* and *C. Leschenaultii*. I have forwarded specimens of both to the India-house.

206. *Himantopus asiaticus* of Lesson. It appears never to have the black cap of *H. melanopterus*.

209. This appears to be the *Totanus stagnatilis*.

220 *b*. Mr. Jerdon has obtained the *Calidris arenaria*; he also gets *Numenius phaeopus*, which I have not yet seen here; and his oyster-catcher is the *Hematopus longirostris*, which I have likewise received from Arracan.

234, 235. Are male and young female of the same species, which is also the *Gallinula plumbea* of Vieillot.

241 *a*. Two species of flamingoes occur here, the *Phænicopterus antiquorum*, Tem., more rarely, and the *P. minor*. I have had a fine series prepared of both.

263. *Plotus Vaillantii*. A bird of this species was brought to me some time ago, weak from want of food, caused by its having swallowed, or, I should rather say, attempted to swallow, a small Siluroid (*Bagrus teugara*), which had erected its pectoral spines and thus pierced the throat of the bird, the spines of the fish projecting on either side through the skin of its captor.

265. I have lately procured several specimens of both species of pelican mentioned.

266 *a*. *Rhynchops flavirostris*. Now and then observed upon the river opposite Calcutta, skimming and *ploughing* the surface of the water.

Nov. 2, 1843.

### XIX.—Observations on Ehrenberg's *De Mycetogenesi Epistola*, &c.

By ARTHUR HILL HASSALL, Esq.

IN the 'Annals and Magazine of Natural History' for November 1842 the following editorial remark occurs, appended to a notice of a paper read by me before the Microscopical Society of London, and entitled "An Explanation of the Cause of the rapid Decay of many Fruits, more especially of those of the Apple Tribe:"—

"Complete observations on this interesting subject have been made known by Professor Ehrenberg so far back as 1820 in the 'Regensburger Flora,' ii. p. 535, and more fully in the 'Nova Acta Nat. Cur.' vol. x., under the title 'De Mycetogenesi Epistola.'"

A repetition of the substance of the same observation, affixed to a paper on the Influence of Fungi in the Production of Disease, in-

serted in the 'Annals' for August 1843, caused me to consult Professor Ehrenberg's 'De Mycetogenesi Epistola.'

The illustrious Professor of Berlin, after citing the various opinions entertained by naturalists as to the nature of Fungi, proceeds to give descriptions of certain species, together with the details of experiments performed with the view of determining the fact of their development from sporules or seeds.

The first species which the Professor describes, "*Ordeium Fructigerum*," he says, "springs up in PUTRID pears, apples, and plums in whatsoever manner cultivation shall have changed these. The most luxuriant crop usually proceeds from those apples which either hang from the tree or lie upon the ground, premature decay having invaded them. At 7 A.M. of the 20th day of August, I sowed the sporidia of this fungus in a *putrid* pear so cut up as that it should show similar plants wherever these were placed upon it. I thought moreover, that if any germs could proceed out of the sporangia, that this ought more readily to occur in a soil manifestly adapted to the nourishment of these plants, and experience taught me that all fungi would not grow in every putrid body. I performed the experiment in the following manner:—

"I cut up a pear, drew out with the moist point of a fine knife applied to the tufts of the fungi an abundance of sporidia, and deposited them in some internal part of the *putrid* pear. In this manner I placed many little heaps of sporidia near to each other, all being visible. I placed the pear in such a situation as that I could always procure it, but it was deposited in high grass every dewy morning, nor could it be touched by the sun. At 8 o'clock the next morning I sought for the grains sown yesterday. I saw all the heaps with the unaided sight shining as though adorned with silk, and some even were subhirsute. I concluded that now the germs had come forth. Immediately I removed with the point of a knife a small portion of one of the clusters, and being placed in a drop of water on a piece of glass, I separated it with the aid of two very fine knives. I saw the germs of the sporidia increased in diameter about a hundred times, and so distinct as that any one ought to be able to perceive them readily who sought for them after my method."

The above and other experiments with another fungus, *Rhizopus nigricans*, conducted, as Ehrenberg especially tells us, in precisely the same manner as the former, are the only ones which he performed with the view of determining the development of fungi in connexion with fruit. Now it is not a little curious to notice that the condition of the fruit experimented on should be so particularly referred to in the account, viz. that it was in a state of putridity or decay, as though it were conceived that such a condition was a circumstance essential to the development of the fungi; the worthy Professor little imagining (as was most probably the case, for it is a rare thing for a fruit, vegetable or flower to decay without the co-operation of fungi) that the sporules which he was at so much pains to introduce existed already in the decayed fruit, and that his sections did little more than present a direct way of egress to the filaments of the fungi.

From a consideration of the above-quoted remarks it is therefore evident, that Ehrenberg merely employed the putrid fruit as a nidus favourable for the growth of the fungi; that he did not inoculate sound fruit; that he had no suspicion of the real cause of its decay, much less an accurate knowledge of it, as the writer of the paragraph quoted in the commencement of this paper supposed; and that he has consequently in no way anticipated the observations made by me on the cause of the destruction of fruit, contained in certain papers read before the Microscopical Society of London.

Ehrenberg's epistle was undertaken, as its title implies, with a view of ascertaining the modes of reproduction and development of fungi, and for the purpose of disproving the dangerous doctrine of spontaneous generation; an endeavour which was eminently successful as regards the tribe of Fungi.

In the second paper of mine, referred to before, entitled "Observations on a Disease, the production of a Fungus, occurring in the Lettuce and other vegetables," ('Annals' for August 1843,) the following observation occurs:—

"One of the greatest peculiarities of the fungi consists in the preference which they manifest for organic matter in a concentrated form. But it has hitherto been supposed that their powers were confined to dead organic matter, which they speedily decompose, assimilate and remove," &c.

It was my intention to have added, and I thought that I had done so, after the word dead, "or diseased," and my omitting to do so subjected me to the underwritten remark of the editor:—

"This statement is by no means correct; the researches of Ehrenberg, Meyen, and many other physiologists have long since proved the falsity of this now antiquated notion."

That the omission of the words "or diseased" was an oversight, and that I was fully acquainted with the fact that fungi were sometimes found in the diseased living tissue, may be gathered from the perusal of the opening paragraph of my paper, which, as I wish to exonerate myself from so manifest an imputation of ignorance of a well-known fact, I may perhaps be pardoned for quoting:—

"The production of diseases through the agency of fungi, whether in the animal or vegetable fabric, has not hitherto received that degree of attention to which the frequency of their occurrence and the importance of the subject so eminently entitle them." Here then is a distinct admission of the existence of fungi in the diseased living organism. I must confess, however, that until very recently I was not aware that any other experiments were in existence proving the power of fungi to originate diseased action, not merely in the living tissue, but in it when in a perfectly sound condition of vitality, save those made known by me in reference to fruit, flowers and vegetables.

I now know, however, that unexceptionable experiments have been made to determine this point by Bassi and Audouin\*, who produced

\* Rapport sur divers travaux entrepris au sujet de la maladie des Vers

the destruction of the caterpillar of the silk-worm by inoculating it with a fungus; and by Dr. Hannover\*, by whom several sound fresh-water salamanders were inoculated, and all successfully, some of the animals having died through the development of the fungi thus introduced. Other observers have probably adduced additional proofs of the same wonderful and important manifestation of the power of fungi in attacking and subduing the healthy living structure.

Cheshunt, Aug. 24, 1843.

*Observations on the preceding Communication.* By W. FRANCIS.

As the notes in question were inserted by me, it is but fair that I should receive any blame attaching to them. From the perusal of Mr. Hassall's observations on the first note, which obviously could have no reference to a paper published nine months later, and his conclusions as to what the writer of it supposed, the reader would imagine that Mr. Hassall had described the inoculation of sound fruit, explained the cause of decay, &c. &c.; he will therefore be not a little surprised, on referring to the paragraph to which the note was appended and to which it solely applied, to find that no mention is made by Mr. Hassall of sound fruit, but of the mode of growth of fungi in a "portion of *decayed* apple." Further observation is therefore unnecessary.

With respect to the second note, fortunately the two concluding paragraphs of Mr. Hassall's present communication completely justify its insertion; it will suffice that the reader should compare Mr. Hassall's paper in the August number of the 'Annals,' where he supposes himself to be the first discoverer of an interesting fact, with the two paragraphs in question, in which he confesses his total ignorance at that time of the numerous and complete experiments and observations that had been previously published on the subject, to judge how much the author has benefited by the editorial note of which he complains. I could not be aware of what it was Mr. Hassall's *intention* to have inserted; but when it was found to be broadly stated that the powers of Fungi were *CONFINED* to *dead* matter, it was the duty of the editors to their readers no less than to themselves to point out the incorrectness of the assertion. But supposing the word "diseased," which Mr. Hassall endeavours to show from the opening paragraph had been omitted by an oversight, to have been inserted, the note in question would not have been a whit the less correct, as is evident from Mr. Hassall's subsequent confession.

Mr. Hassall states that he "*now knows* that unexceptionable experiments have been made," but in fairness to myself he should have also stated how he came by his knowledge; he should have informed the reader that in an interview soon after the insertion of the last note, he denied altogether the accuracy of the statement, and that I

à Soie, connue vulgairement sous le nom de Muscardine. Par M. Dutrochet. — *Annales des Sciences Naturelles*, Partie Zoologique, tome neuvième.

\* Muller's Archiv.

immediately read to him an account of Dr. Hannover's successful experiments of inoculation on the freshwater salamander, and moreover furnished him with references to other papers on the subject. In return, Mr. Hassall endeavours to turn to account a slight inaccuracy in the note, in order to cover his admitted want of acquaintance with the subject upon which he had been writing.

## XX.—*Information respecting Scientific Travellers.*

### *Details respecting some parts of Mexico and their Vegetation\*.*

TOWARDS the end of 1840 the Danish government sent to Mexico M. Liebmann, a distinguished botanist, who had been several years preparing for this journey; he was accompanied by a gardener, who was to gather fresh plants and seeds for the botanic garden at Copenhagen. This little scientific expedition seems to succeed well; the gardener is already returned with a rich collection of living plants, amongst which are a hundred and twenty *Orchideæ*. M. Liebmann remains in Mexico and will not return until the spring of next year. The following are extracts from three of his letters, which appear to give full information respecting this country, so favoured by nature, and at the same time so unfortunate.

“ Vera-Cruz, February 21, 1841.

“ I intend to travel with Mr. Karwinsky, a Russian naturalist. The present condition of Mexico obliges those who would explore it to form a party of several together, in order to face the dangers to which the complete demoralization of the population, and the anarchy which everywhere exists, expose the traveller at each moment. It is a sad spectacle to see this fine country given up to universal pillage†. One step further, and all the ties and every law which govern society will have disappeared from it. Throughout nothing is to be seen but deceit and perjury. The interior of the country swarms with thieves, who rob and murder with perfect impunity. The few honest people who still remain bitterly regret the downfall of Spanish domination, and pray for its re-establishment; but what is Spain herself now? The only part of the Mexican people who may still be trusted are the Indians, and we consequently made up our minds as much as possible upon our excursions to make choice of the villages belonging to this nation to take up our abode at.

“ During our fourteen days stay here, we have been almost exclusively occupied with the necessary preparations for our journey. There are at present difficulties to surmount, with regard to this, of which no one can form any idea. Nothing can be obtained without paying extravagant prices; and if we did not reckon upon the hospitality of the Indians, the last remaining virtue that reminds us of

\* Extracted from the *Flora*, February 1843, as given in the *Bib. Universelle de Genève*, July 1834.

† The article relating to the journey of Mr. Stephens (*Bibl. Univ.* May 1843, p. 71 and following) contains details no less deplorable respecting the political and moral state of central America and of Yucatan.